



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,508	09/26/2006	Daniel Kopf	117891	9426
7590 OLIFF & BERRIDGE, PLC P. O. Box 19928 Alexandria, VA 22320			EXAMINER ZHANG, YUANDA	
			ART UNIT 2828	PAPER NUMBER
			MAIL DATE 04/01/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/578,508

Applicant(s)

KOPF ET AL.

Examiner

YUANDA ZHANG

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sprangle et al (US Patent 5,353,291) in view of M. Hentschel et al (Generation of 0.1-TW optical pulses with a single-stage Ti:sapphire amplifier at a 1-kHz repetition rate" Appl. Phys. B 70 [Suppl.], S161-S164 2000).
4. In re claim 1, with reference to figure 1, Sprangle et al disclose laser system having a repetition rate greater than 50 KHz (preamble is not given patentable weight; even if it were given patentable weight, it would have been obvious to adjust the repetition rate to obtain various power outputs) according to the principle of the regenerative amplifier (recycler or low gain amplifier 42), comprising at least an amplifying laser medium, a laser resonator (a ring resonator 56 formed by mirrors 26, 28, 34 and 36) having at least one resonator mirror (28) (col. 3 lines 19-21) and at least one modulator (Pockels cell 48) (col. 3 lines 28-30), and a pump source (pump laser 22) for pumping the laser medium, wherein the laser resonator has a pulse stretcher (42

can be a high energy recycler which is capable of performing pulse stretching) (col. 4 lines 1-11), inside a cavity of the resonator (see figure 1).

5. Sprangle et al do not disclose wherein the laser resonator has a pulse stretcher as a specially designed component having a structure- and/or material-related dispersive effect, the pulse stretcher having minimum 3rd order dispersion with maximum 2nd order dispersion.

6. However, with reference to figure 3, M. Hentschel et al disclose a pulse stretcher which includes a SF57 glass (page S162, first paragraph under 2 Setup) having a minimum 3rd order dispersion with a maximum 2nd order dispersion (According to the 112 rejection above, the pulse stretcher as SF57 has an inherent material property of having a minimum 3rd order dispersion with a maximum 2nd order dispersion).

7. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the laser system of Sprangle et al with a pulse stretcher having a material property of a minimum of 3rd order dispersion with a maximum of 2nd order dispersion as taught by M. Hentschel et al in order to obtain high efficiency pulse stretching without introducing any alignment issue (page S162, first paragraph under 2 Setup).

8. Claims 1-4, 6-12 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jovanovic et al (US PG Pub 2002/0149836 A1) in view of M. Hentschel et al (Generation of 0.1-TW optical pulses with a single-stage Ti:sapphire amplifier at a 1-kHz repetition rate" Appl. Phys. B 70 [Suppl.], S161-S164 2000).

9. In re claim 1, with reference to figure 2, Jovanovic et al disclose laser system having a repetition rate greater than 50 KHz (preamble is not given patentable weight; even if it were given patentable weight, it would have been obvious to adjust the repetition rate to obtain various power outputs) according to the principle of the regenerative amplifier (Ti: sapphire regenerative amplifier), comprising at least an amplifying laser medium (Ti: sapphire laser medium), a laser resonator (a resonator formed by oscillator 302 and mirror 313) having at least one resonator mirror (313) and at least one modulator (Pockels cell 305), and a pump source (pump laser 301) for pumping the laser medium, wherein the laser resonator has a pulse stretcher (grating 311 and lens 312), inside a cavity of the resonator (paragraph [0029] and figure 4).
10. Jovanovic et al do not disclose wherein the laser resonator has a pulse stretcher as a specially designed component having a structure- and/or material-related dispersive effect, the pulse stretcher having minimum 3rd order dispersion with maximum 2nd order dispersion.
11. However, with reference to figure 3, M. Hentschel et al disclose a pulse stretcher which includes a SF57 glass (page S162, first paragraph under 2 Setup) having a minimum 3rd order dispersion with a maximum 2nd order dispersion (According to the 112 rejection above, the pulse stretcher as SF57 has an inherent material property of having a minimum 3rd order dispersion with a maximum 2nd order dispersion).
12. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the laser system of Jovanovic et al with a pulse stretcher having a material property of a minimum of 3rd order dispersion with a

maximum of 2nd order dispersion as taught by M. Hentschel et al in order to obtain high efficiency pulse stretching without introducing any alignment issue (page S162, first paragraph under 2 Setup).

13. In re claim 2, M. Hentschel et al disclose wherein the pulse stretcher has a block of highly dispersive material (inherent property of SF57).

14. In re claim 3, M. Hentschel et al disclose multiple reflections takes place within the block (inherent for SF57).

15. In re claims 4 and 16, M. Hentschel et al disclose a dispersive layer which is a used as a folding mirror (pulse stretcher includes a plurality of folding mirror, see figure 3).

16. In re claim 6, Jovanovic et al / M. Hentschel et al have disclosed the claimed invention above except wherein the laser medium has an inversion life (storage time) greater than 1 ms. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose a laser medium having an inversion life of greater than 1 ms in order to obtain a higher output power, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

17. In re claim 7, Jovanovic et al disclose wherein a femtosecond oscillator for inputting seed pulses, the femtosecond oscillator being formed and arranged in such a way that the seed pulses are femtosecond pulses or picosecond pulses on input into the laser resonator (paragraph [0029]).

18. In re claim 8, Jovanovic et al disclose wherein an electro-optical switching element as modulator (Pockels cell 305) (paragraph [0029]).
19. In re claim 9, Jovanovic et al disclose wherein a pulse compressor (400) is outside the laser resonator (paragraph [0035]).
20. In re claim 10, Jovanovic et al disclose wherein the pulse compressor has a dispersive grating having less than 1700 lines/mm (1480 lines/mm, paragraph [0035]).
21. In re claim 11, M. Hentschel et al disclose wherein the pump source is a laser diode (diode pumped Nd: YVO₄, see figure 3).
22. In re claim 12, M. Hentschel et al disclose wherein the highly dispersive material is SF57 glass block (page S162, first paragraph under 2 Setup).
23. In re claim 14, Jovanovic et al / M. Hentschel et al have disclosed the claimed invention above except wherein the laser medium is a Yb:glass or Yb:crystal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose a laser medium of Yb:glass or Yb:crystal in order to obtain a longer inversion time which increase output power (see applicant admitted prior art "Directly diode-pumped Yb:KY(WO₄)₂ regenerative amplifier"), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.
24. In re claim 15, Jovanovic et al / M. Hentschel et al have disclosed the claimed invention except wherein the pulse compressor has a dispersive grating less than 1200 lines/mm. It would have been obvious to one having ordinary skill in the art at the time

the invention was made to have modified the dispersive grating of Jovanovic et al with less than 1200 lines/mm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 MPEP 2144.05 (II-A)

25. In re claim 17, Jovanovic et al disclose a relationship of the pulse compressor outside the laser resonator is according to Treacy design (inherent, based on the claim language, the Examiner notes that Treacy design is satisfied if the pulse compressor is placed outside of the laser resonator).

26. Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jovanovic et al (US PG Pub 2002/0149836 A1) in view of M. Hentschel et al ("Generation of 0.1-TW optical pulses with a single-stage Ti:sapphire amplifier at a 1-kHz repetition rate" Appl. Phys. B 70 [Suppl.], S161-S164 2000) as applied to claim 1 above, and further in view of Pang (US PG Pub 2003/0095320 A1).

27. In re claim 5, Jovanovic et al / M. Hentschel et al have disclosed the claimed invention above except wherein the pulse stretcher has at least two reflecting surfaces, the surfaces being arranged in such a way that the surfaces are oriented - relative to one another and - at an opening angle, and the laser beam is reflected at least twice at least one of the surfaces. However, with reference to figure 2, Pang discloses a pulse stretcher (50) has at least two reflecting surfaces (70 & 72), the surfaces being arranged in such a way that the surfaces are oriented - relative to one another (facing each other) and - at an opening angle (angle θ), and the laser beam is reflected at least twice at

least one of the surfaces (paragraph [0028]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the laser system of Jovanovic et al / M. Hentschel et al with an alternative pulse stretcher as taught by Pang in order to obtain a tunable pulse stretcher.

28. In re claim 13, Pang discloses wherein the opening angle is adjustable (grating 70 is tunable by adjusting its angle, see figure 2).

Conclusion

29. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YUANDA ZHANG whose telephone number is

(571)270-1439. The examiner can normally be reached on Monday-Friday, 9:00am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ARMANDO RODRIGUEZ/
Primary Examiner, Art Unit 2828

/Yuanda Zhang/
Examiner, Art Unit 2828
03/24/09